

IN THE CLAIMS:

1. (Currently Amended) A semiconductor device comprising:
a semiconductor layer having a crystalline structure on an insulating surface, the semiconductor layer having at least a source region, a drain region and a channel region, wherein the channel region contains a rare gas element having a concentration gradient, and the channel region has at least a first portion and a second portion, the second portion being more distant from the insulating surface than the first portion, and
~~wherein the rare gas element comprises one selected from the group consisting of Ne, Ar, Kr and Xe~~
wherein a crystallinity of the first portion in the channel region is higher than that of the second portion in the channel region.
2. (Canceled)
3. (Original) A semiconductor device according to claim 1, wherein the semiconductor device is a liquid crystal display device.
4. (Original) A semiconductor device according to claim 1, wherein the semiconductor device is an EL display device.
5. (Original) A semiconductor device according to claim 1, wherein the semiconductor device is at least one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, a digital camera, a projector, a portable telephone, and a portable book.
6. (Currently Amended) A semiconductor device comprising:
a semiconductor layer having a crystalline structure on an insulating surface, the semiconductor layer having at least a source region, a drain region and a channel region, an insulating film on the semiconductor layer,

wherein a rare gas element having a concentration gradient is contained between the channel region and the insulating film, and the channel region has at least a first portion and a second portion, the second portion being more distant from the insulating surface than the first portion, and

~~wherein the rare gas element comprises one selected from the group consisting of Ne, Ar, Kr and Xe~~

wherein a crystallinity of the first portion in the channel region is higher than that of the second portion in the channel region.

7. (Canceled)

8. (Original) A semiconductor device according to claim 6, wherein the semiconductor device is a liquid crystal display device.

9. (Original) A semiconductor device according to claim 6, wherein the semiconductor device is an EL display device.

10. (Original) A semiconductor device according to claim 6, wherein the semiconductor device is at least one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, a digital camera, a projector, a portable telephone, and a portable book.

11. (Currently Amended) A semiconductor device comprising:
a first semiconductor layer having a crystalline structure on an insulating surface;
a second semiconductor layer ~~in contact with~~ on the first semiconductor layer;
an insulating film in contact with the second semiconductor layer; and
an electrode in contact with the insulating film,
wherein the second semiconductor layer contains a rare gas element having a concentration gradient, and

~~wherein the rare gas element comprises one selected from the group consisting of Ne, Ar, Kr and Xe~~

wherein a crystallinity of the first semiconductor layer is higher than that of the second semiconductor layer.

12. (Original) A semiconductor device according to claim 11, wherein the second semiconductor layer has a crystalline structure.

13. (Original) A semiconductor device according to claim 11, wherein the second semiconductor layer has an amorphous structure.

14. (Canceled)

15. (Original) A semiconductor device according to claim 11, wherein the semiconductor device is a liquid crystal display device.

16. (Original) A semiconductor device according to claim 11, wherein the semiconductor device is an EL display device.

17. (Original) A semiconductor device according to claim 11, wherein the semiconductor device is at least one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, a digital camera, a projector, a portable telephone, and a portable book.

18. (Currently Amended) A semiconductor device comprising:
a semiconductor layer having a crystalline structure on an insulating surface;
a gate insulating film adjacent to the semiconductor layer,
wherein the semiconductor layer contains a rare gas element having a concentration gradient along a direction perpendicular to the insulating surface, and the channel region has at least a first portion and a second portion, the second portion being more distant from the insulating surface than the first portion, and

~~wherein the rare gas element comprises one selected from the group consisting of Ne, Ar, Kr and Xe~~

wherein a crystallinity of the first portion in the semiconductor layer is higher than that of the second portion in the semiconductor layer.

19. (Canceled)

20. (Original) A semiconductor device according to claim 18, wherein the semiconductor device is a liquid crystal display device.

21. (Original) A semiconductor device according to claim 18, wherein the semiconductor device is an EL display device.

22. (Original) A semiconductor device according to claim 18, wherein the semiconductor device is at least one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, a digital camera, a projector, a portable telephone, and a portable book.

23. (Currently Amended) A semiconductor device comprising:
a semiconductor layer having a crystalline structure on an insulating surface;
a gate insulating film adjacent to the semiconductor layer,
wherein the semiconductor layer contains a rare gas element ~~comprising one selected from the group consisting of Ne, Ar, Kr and Xe~~, a first portion of the semiconductor layer having a higher concentration of the rare gas element than a second portion of the semiconductor layer, wherein the first portion is closer to the gate insulating film than the second portion, and wherein a crystallinity of the second portion is higher than that of the first portion.

24. (Canceled)

25. (Original) A semiconductor device according to claim 23, wherein the semiconductor device is a liquid crystal display device.

26. (Original) A semiconductor device according to claim 23, wherein the semiconductor device is an EL display device.

27. (Original) A semiconductor device according to claim 23, wherein the semiconductor device is at least one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, a digital camera, a projector, a portable telephone, and a portable book.

Claims 28 – 40 (Canceled)

Please add new claims 41-56 as follows.

41. (New) A semiconductor device according to claim 1, wherein the lower layer in the channel region comprises poly-silicon and the upper layer in the channel region comprises amorphous silicon.

42. (New) A semiconductor device according to claim 6, wherein the lower layer in the channel region comprises poly-silicon and the upper layer in the channel region comprises amorphous silicon.

43. (New) A semiconductor device according to claim 11, wherein the first semiconductor layer comprises poly-silicon and the second semiconductor layer comprises amorphous silicon.

44. (New) A semiconductor device according to claim 18, wherein the lower layer in the channel region comprises poly-silicon and the upper layer in the channel region comprises amorphous silicon.

45. (New) A semiconductor device comprising:
an electrode over an insulating surface;
an insulating film over the electrode;

a semiconductor layer having at least a source region, a drain region and a channel region over the electrode with the insulating film interposed therebetween,

wherein the channel region contains a rare gas element having a concentration gradient.

46. (New) A semiconductor device according to claim 45, wherein the semiconductor device is a liquid crystal display device.

47. (New) A semiconductor device according to claim 45, wherein the semiconductor device is an EL display device.

48. (New) A semiconductor device according to claim 45, wherein the semiconductor device is at least one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, a digital camera, a projector, a portable telephone, and a portable book.

49. (New) A semiconductor device comprising:
an electrode over an insulating surface;
an insulating film over the electrode;
a semiconductor layer having at least a source region, a drain region and a channel region over the electrode with the insulating film interposed therebetween,
wherein a rare gas element having a concentration gradient is contained between the channel region and the insulating film.

50. (New) A semiconductor device according to claim 49, wherein the semiconductor device is a liquid crystal display device.

51. (New) A semiconductor device according to claim 49, wherein the semiconductor device is an EL display device.

52. (New) A semiconductor device according to claim 49, wherein the semiconductor device is at least one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, a digital camera, a projector, a portable telephone, and a portable book.

53. (New) A semiconductor device comprising:
an electrode over an insulating surface;
an insulating film over the electrode;
a first semiconductor layer over the electrode with the insulating film interposed therebetween; and
a second semiconductor layer over the first semiconductor layer,
wherein the second semiconductor layer contains a rare gas element having a concentration gradient.

54. (New) A semiconductor device according to claim 53, wherein the semiconductor device is a liquid crystal display device.

55. (New) A semiconductor device according to claim 53, wherein the semiconductor device is an EL display device.

56. (New) A semiconductor device according to claim 53, wherein the semiconductor device is at least one selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, a digital camera, a projector, a portable telephone, and a portable book.